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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/585,878

07/11/2006

Takashi Tanioka

TANIOKA=1

7726

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EXAMINER

GAMBETTA, KELLY M

ART UNIT

PAPER NUMBER

1715

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/585,878	<b>Applicant(s)</b> TANIOKA ET AL.	
	<b>Examiner</b> KELLY GAMBETTA	<b>Art Unit</b> 1715	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 25-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 and 29-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 8 July 2010 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-12, 14-19, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US 2004/0109817 A1).

As to claim 1, Smith et al. teaches exciting a fluoro compound by conferring energy on a fluoro compound containing gas under reduced pressure (paragraphs 0011, 0015, 0028, 0031, 0037 – atomic fluorine as the excited fluoro compound under vacuum) and partially or completely converting the excited fluoro compound containing gas to fluorine (paragraph 0037-0038 – atomic to molecular fluorine). Smith et al. does not explicitly teach that the fluoro compound is converted to fluorine gas at atmospheric pressure or over atmospheric pressure. However, Smith et al. uses a pressure gradient across a membrane in order to convert the atomic fluorine to molecular fluorine (paragraphs 0035, 0037-0038). As the output of the membrane has a lower pressure in these sections, it would be obvious to modify the pressure on the input side of the membrane to be greater in order to make optimize the effectiveness of the gradient. Therefore, modification of this variable is of routine experimentation and is not inventive. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to include the pressure where the fluorine is converted from atomic to molecular fluorine at atmospheric pressure or higher in order to have a sufficient pressure gradient across the membrane, since it has been held that where the general

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conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 223 (CCPA 1955).

As to claims 2-8, Smith et al. shows two zones of a plasma generator where the gas is excited (reference number 230) and the recombination/membrane area (reference numbers 260, 264, 280 and 282) in Figure 2, for example. These may be considered separate "chambers" as broadly claimed. The pressure of the transportation system where atomic fluorine is converted to molecular fluorine may be modified by routine experimentation as discussed above to produce an acceptable pressure gradient for the membrane that separates the molecular fluorine. As some of the areas are under vacuum (plasma chamber in paragraph 0028) a vacuum pump will inherently be utilized during this process.

As to claim 9, plasma is used for exciting the fluoro compound in paragraph 0015 or 0031, for example.

As to claims 10-11 and 14, the claimed fluoro compounds are used in paragraph 0008, for example.

As to claim 12, an inert gas with respect to the fluorine may be used as an inert transport medium for fluorine as broadly claimed in paragraph 0008 or 0030.

As to claim 15, Smith et al. teaches perfluorocarbons in paragraph 0008, for example. As the limitations in this claim are optional; Smith et al. meets these limitations.

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As to claim 16, in addition to the limitations already discussed above, the fluorine generated may be used in a process chamber below, at, or above atmospheric pressure with an article to be surface modified in paragraph 0053.

As to claim 17, an inert gas with respect to the fluorine may be used as an inert transport medium for fluorine as broadly claimed in paragraph 0008 or 0030.

As to claims 18-19, a polymer surface may be fluorinated in paragraph 0053.

As to claims 29-30, their limitations are met as discussed above.

Claims 13 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. in view of Laxman et al. (US 5492736).

As to claim 13, Smith et al. teaches the suitability of using inert carrier gases during the fluorine generation as discussed above, but not the inert gases claimed. Laxman et al. teaches that the claimed inert gases are suitable as carrier gases for plasma processes in column 3 lines 15-20 and column 5 lines 49-55. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith et al. to include the claimed carrier gases of Laxman et al. because both have shown a recognized suitability and operability of such inert carrier gases in the plasma arts.

Smith et al. teach the limitations of claims 20-24 as discussed above, but do not fluorinate a compound on a substrate composed of the claimed materials using the generated fluorine gas. Laxman et al. teaches fluorinating a silicon oxide compound in the abstract (claims 20-23) by LPCVD (claim 24) in column 7 lines 27-47 using an inert

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gas or oxygen (claim 17) in column 3 lines 15-20 and column 5 lines 37-40 in order to control the dielectric constant of the silicon films in column 1 lines 5-30.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Smith et al. to include fluorinating a compound on a substrate and LPCVD as taught by Laxman et al. in order to control a dielectric constant of the resulting fluorinated silicon oxide film.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KELLY GAMBETTA whose telephone number is

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(571)272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kelly M Gambetta  
Examiner  
Art Unit 1715

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/Timothy H Meeks/  
Supervisory Patent Examiner, Art Unit 1715